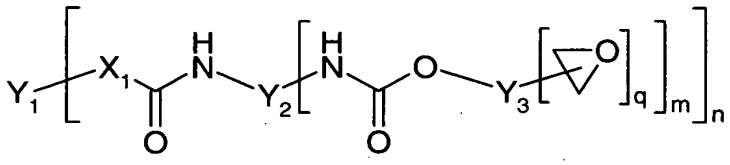
Patent claims

1. A composition comprising

at least one epoxide adduct **A** having on average more than one epoxide group per molecule;

at least one polymer **B** of the formula (I)



(I)

in which

X_1 is O, S or NH;

Y_1 is an n-valent radical of a reactive polymer after removal of the terminal amino, thiol or hydroxyl groups;

Y_2 is a divalent radical of aliphatic, cycloaliphatic, aromatic or araliphatic diisocyanates after removal of the isocyanate groups
or is a trivalent radical of trimers or biurets of aliphatic, cycloaliphatic, aromatic or araliphatic diisocyanates after removal of the isocyanate groups;

Y_3 is a radical of an aliphatic, cycloaliphatic, aromatic or araliphatic epoxide containing a primary or secondary hydroxyl group after removal of the hydroxide and epoxide groups;

q is 1, 2 or 3;

m is 1 or 2; and

n is 2, 3 or 4;

at least one thixotropic agent **C** based on a urea derivative in a non-diffusing carrier material;

and

at least one hardening agent **D** for epoxy resins which is activated by elevated temperature.

2. The composition as claimed in claim 1, characterized in that the epoxide adduct **A** is obtainable from the reaction

of at least one dicarboxylic acid and at least one diglycidyl;

or

of at least one bis(aminophenyl) sulfone isomer or of at least one aromatic alcohol and at least one diglycidyl ether.

3. The composition as claimed in claim 2, characterized in that the dicarboxylic acid is a dimeric fatty acid, in particular at least one dimeric C_4-C_{20} fatty acid, and the diglycidyl ether is bisphenol A diglycidyl ether, bisphenol F diglycidyl ether or bisphenol A/F diglycidyl ether.

4. The composition as claimed in claim 2 or 3, characterized in that the aromatic alcohol is selected from the group consisting of 2,2-bis(4-hydroxyphenyl)propane, bis(4-hydroxyphenyl)-methane, bis(4-hydroxyphenyl)sulfone, hydro-quinone, resorcinol, pyrocatechol, naphtho-hydroquinone, napthoresorcinol, dihydroxy-

naphthalene, dihydroxyanthraquinone, dihydroxybiphenyl, 3,3-bis(p-hydroxyphenyl)phthalides, 5,5-bis(4-hydroxyphenyl)hexahydro-4,7-methanoindane and all isomers of the abovementioned compounds and the diglycidyl ether is bisphenol A diglycidyl ether, bisphenol F diglycidyl ether or bisphenol A/F diglycidyl ether.

5. The composition as claimed in any of the preceding claims, characterized in that the polymer **B** is resilient.

6. The composition as claimed in any of the preceding claims, characterized in that the polymer **B** is soluble or dispersible in epoxy resins.

7. The composition as claimed in any of the preceding claims, characterized in that, in formula (I), n is 2 or 3.

8. The composition as claimed in any of the preceding claims, characterized in that the polymer on which Y_1 in formula (I) is based is an α,ω-polyalkylene glycol having C_2-C_6-alkylene groups or having mixed C_2-C_6-alkylene groups which is terminated with amino, thiol or, preferably, hydroxyl groups.

9. The composition as claimed in any of the preceding claims, characterized in that the polymer on which Y_1 in formula (I) is based is an OH equivalent weight of 600 - 6000 g/OH equivalent, in particular of 700 - 2000 g/OH equivalent.

10. The composition as claimed in any of the preceding claims, characterized in that m is 1 and the diisocyanate on which Y_2 in formula (I) is based is preferably HDI, IPDI, MDI or TDI.

11. The composition as claimed in any of the preceding claims, characterized in that the proportion by weight of all polymers **B** of the formula (I) is from 5 to 40% by weight, preferably from 7 to 30% by weight, based on the weight of the total composition.

12. The composition as claimed in any of the preceding claims, characterized in that the carrier material of the thixotropic agent **C** is a blocked polyurethane prepolymer.

13. The composition as claimed in any of the preceding claims, characterized in that the urea derivative in the thixotropic agent **C** is the product of the reaction of an aromatic monomeric diisocyanate, in particular 4,4'-diphenylmethylene diisocyanate, with an aliphatic amine compound, in particular butylamine.

14. The composition as claimed in any of the preceding claims, characterized in that the proportion by weight of the thixotropic agent **C** is 5 - 40% by weight, preferably 10 - 25% % by weight, based on the weight of the total composition.

15. The composition as claimed in claim 14, characterized in that the proportion of the urea derivative is 5 - 50% by weight, preferably 15 - 30% by weight, based on the weight of the thixotropic agent **C**.

16. The composition as claimed in any of the preceding claims, characterized in that the hardening agent **D** is a latent hardening agent selected from the group consisting of dicyandiamide, guanamines, guanidines and aminoguanidines.

17. The composition as claimed in any of the preceding claims, characterized in that the total proportion of the hardening agent **D** is 1 - 10% by weight, preferably 2 - 8% by weight, based on the weight of the total composition.

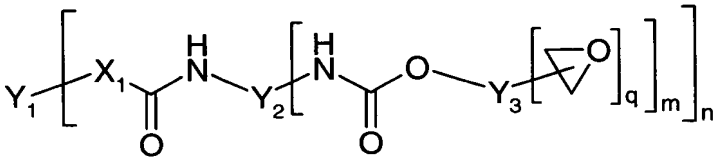
18. The composition as claimed in any of the preceding claims, characterized in that at least one filler **E** is additionally present.

19. The composition as claimed in claim 15, characterized in that the total proportion of the filler **E** is 5 - 30% by weight, preferably 10 - 25% by weight, based on the weight of the total composition.

20. The composition as claimed in any of the preceding claims, characterized in that at least one reactive diluent **F** carrying epoxide groups is additionally present.

21. The composition as claimed in any of the preceding claims, characterized in that, after hardening, the composition has a low-temperature fracture energy, measured according to DIN 11343, of more than 10 J at 0°C and preferably more than 1.0 J at -40°C.

22. An impact modifier terminated by epoxide groups of the formula (I)



(I)

in which

X_1 is O, S or NH;

Y_1 is a n-valent radical of a reactive polymer after removal of the terminal amino, thiol or hydroxyl groups;

Y_2 is a divalent radical of aliphatic, cycloaliphatic, aromatic or araliphatic diisocyanates after removal of the isocyanate groups
or is a trivalent radical of trimers or biurets of aliphatic, cycloaliphatic, aromatic or araliphatic diisocyanates after removal of the isocyanate groups;

Y_3 is a radical of an aliphatic, cycloaliphatic, aromatic or araliphatic epoxide containing a primary or secondary hydroxyl group after removal of the hydroxide and epoxide groups;

q is 1, 2 or 3;

m is 1 or 2; and

n is 2, 3 or 4; preferably 2 or 3.

23. The impact modifier terminated by epoxide groups and as claimed in claim 22, characterized in that the polymer on which Y_1 in formula (I) is based is an α,ω-polyalkylene glycol having C_2-C_6-alkylene groups or or having mixed C_2-C_6-alkylene groups which is terminated by amino, thiol or, preferably, hydroxyl groups.

24. The impact modifier terminated by epoxide groups and as claimed in claim 22 or 23, characterized in that the polymer on which Y_1 in formula (I) is

based is a diol or triol having an OH equivalent weight of 600 - 6000 g/mol, in particular of 700 - 2200 g/OH equivalent.

25. The use of an impact modifier terminated by epoxide groups and as claimed in any of claims 22 to 24 in a one-component thermally hardening epoxy resin adhesive.

26. The use of an impact modifier terminated by epoxide groups and as claimed in any of claims 22 to 24 in a two-component epoxy resin adhesive.

27. The use of a composition as claimed in any of claims 1 to 21 as a one-component adhesive.

28. The use as claimed in claim 27, characterized in that the adhesive is used for the adhesive bonding of heat-stable materials, in particular of metals.

29. The use as claimed in claim 27 or 28, characterized in that the adhesive is used as a body-shell construction adhesive in automotive construction.

30. A method for the adhesive bonding of heat-stable materials, in particular of metals, characterized in that these materials are brought into contact with a composition as claimed in any of claims 1 to 21 and comprises a hardening step at a temperature of 100 - 220°C, preferably 120 - 200°C.

31. The use as claimed in claim 30, characterized in that these materials are brought into contact with a composition as claimed in any of claims 1 - 21, and in that the adhesively bonded materials are used at a temperature of from 100°C to -40°C, p

referably from 80°C to -40°C, in particular from 50°C to -40°C.